

Tropical Areas of Interest Discussion for August 18, 2010

Created 1600 UTC August 18, 2010

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Summary: Today is a Hard-Down Day for the NASA DC-8 flight operations at FLL. The Global Hawk is also not flying today. The PREDICT team is flying a second investigation mission into PGI-27L, and HRD is not currently flying any targets either. There are 4 tropical waves in the Atlantic Basin, 5 pouches identified today by the PREDICT group, a SAL outbreak, and a couple of upper level ridges and troughs that are interacting with these systems. While the models are not currently forecasting the development of PGI-27L in the next 48 hours, it does continue to have a lot of deep convection associated with it, and the NHC has continued (since yesterday afternoon) to identify a 10% chance of formation with this system. However, the global models are continuing to suggest that cyclogenesis will occur with PGI-31L soon (otherwise referred to as the vorticity maxima that emerged from the ITCZ), whereas PGI-30L has moved further north and is embedded in dry air, so it is not expected to develop further. All of these systems, and others, are currently being monitored by the three agencies and the DC-8 continues to be on alert for a possible flight this weekend.

Forecast for 1600 UTC 8/18/2010:

Synoptic Overview:

Although there are several interesting features in the tri-agency domain and beyond, the Atlantic Basin is fairly quiet **(1)**. At low levels in the tropics, a 1021 hPa High is off the southeast coast of the US and slowly moving eastward toward FL, and the Gulf of Mexico as well as the Caribbean Sea have a lot of upper level low pressure widely spread aloft **(3B)**. Aside from the convection just off the southern coast of Louisiana associated with Ex-TD05, the only other major source of convection in the west side of the tri-agency domain is associated with PGI-27L in the Caribbean, and the wave in which the pouch resides **(2)**. There is a shear minima over Cuba, located just to the north of PGI-27L. There are currently four tropical waves analyzed **(1)**. The first is located across the narrowest part of Mexico extending south from the Bay of Campeche at around 22N/92W to 10N/92W, with disorganized convection. There is a second tropical wave, extending from the Bahamas south to South America along about 75W, and is the wave associated with PGI-27L. The vorticity signature with this can be seen well at 700 hPa **(3C)**. In the SAL outbreak area, pouch PGI-32L was identified today, having come south as it was pulled down around the ridge (further discussion below). A large amplitude tropical wave in the Central Atlantic is located from 28N/38W south into the ITCZ around 11N/37W. This wave continues to be fairly dry with minimal convection except where associated with the ITCZ. The fourth tropical wave is just west of the Cape Verde Islands located from 25N/25W south to 10N/26W. The circumstances surrounding the pouches with this wave and the one prior are involved and tracks are dominated by an upper level anticyclone **(3A)** and the ITCZ storms to the south; please see discussion below for PGI-30, -31, -32. Pouch locations are shown in the TPW imagery below **(4)**.

Features of Interest:

Dust/SAL:

As of 1200 UTC on 8/18, the SAL outbreak of the past six days has reached the Lesser Antilles and will soon be impacting visibility in much of the northeastern Caribbean. TPW imagery indicates the location of the SAL across the Atlantic well (4). Terra overpasses from yesterday morning show aerosol optical thicknesses above 0.8 at 63W/20N, or just northeast of the British Virgin Islands (See Terra AOT composite valid at 0000 UTC on 8/18, 5). The SAL outbreak is associated with a broad ridge in the low-level flow which is producing northeasterly winds co-located with the highest AOT values. GEOS-5 forecasts the dusty air to continue to propagate into the northern Lesser Antilles, Virgin Islands, and Puerto Rico. Subsidence has been strong within the SAL layer, and as the dusty air has dissipated from maximum AOTs near 1.3 to near 0.9 it has also been sinking. CALIPSO overpasses are not currently available, but GEOS-5 forecasts validating today at 12 UTC suggest that the maximum dust loading is from the surface to 850 hPa.

PGI-27forecast:

At 1200 UTC on 8/18 PGI-27L was located at 77W/15N. The convection within the system has become more organized near the pouch location overnight. An ASCAT scatterometer pass near 0200 UTC suggests little surface cyclonic flow, however 850 hPa vorticity analyzed by CIMMS does show a local vorticity maximum which was not present in the last three days (See CIMMS multi-product with track, 850 hPa vorticity and SWIR, 6A). Shear across the system has increased, with the vorticity maximum located under 15 kt west-northwesterly shear. There is a short upper level ridge to the west of the system with a short upper level trough to the east of PGI-27L. (See CIMMS multi-product with track, upper level winds and visible/IR, 6B) Global model forecasts are beginning to give PGI-27L a slight northward track component, with landfall expected near the north Belize/Mexico border just before 1200 UTC on 8/20. The ECMWF and GFS now have Okubo-Weiss values increasing above the genesis threshold after 36 hours from the 0000 UTC initialization. The same models expect deep shear over the system to increase rapidly over the next 12 hours, but decrease to below 15 kts by 48 hours (7). While model forecasts and convective organization have become more favorable for development over the last 48 hours, PGI-27L is still far from an ideal genesis situation. The system should continue to be monitored for possible flight operations, however a depression is not likely to form in the next 48 hours.

PGI-32L:

PGI-32L is centered near 47W/22N (4). IR and visible satellite imagery indicates mostly low stratocumulus with no deep convection apparent near the pouch (2). On the other hand, the nearest analyzed wave trough is to the east of the pouch. Up to 50 kt vertical wind shear is a consequence of an upper-level low centered just to the west of the low-level circulation (3B). Despite being in perhaps a favorable region for vertical motion, convection is suppressed due to the low TPW (mid- and upper-level dry air) (4). The ECMFWF forecast location for pouch is: 18/1200UTC: 50W/21.5N; 19/0000UTC: 53W/21N (8). The GFS forecast location is: 18/1200UTC: 47W/21N; 19/0000UTC: 50W/20N; 19/1200UTC: 54W/21N; 20/0000UTC: 57.5W/22N. No genesis is expected for the pouch as suppressed convection is forecast to continue.

PGI-30L:

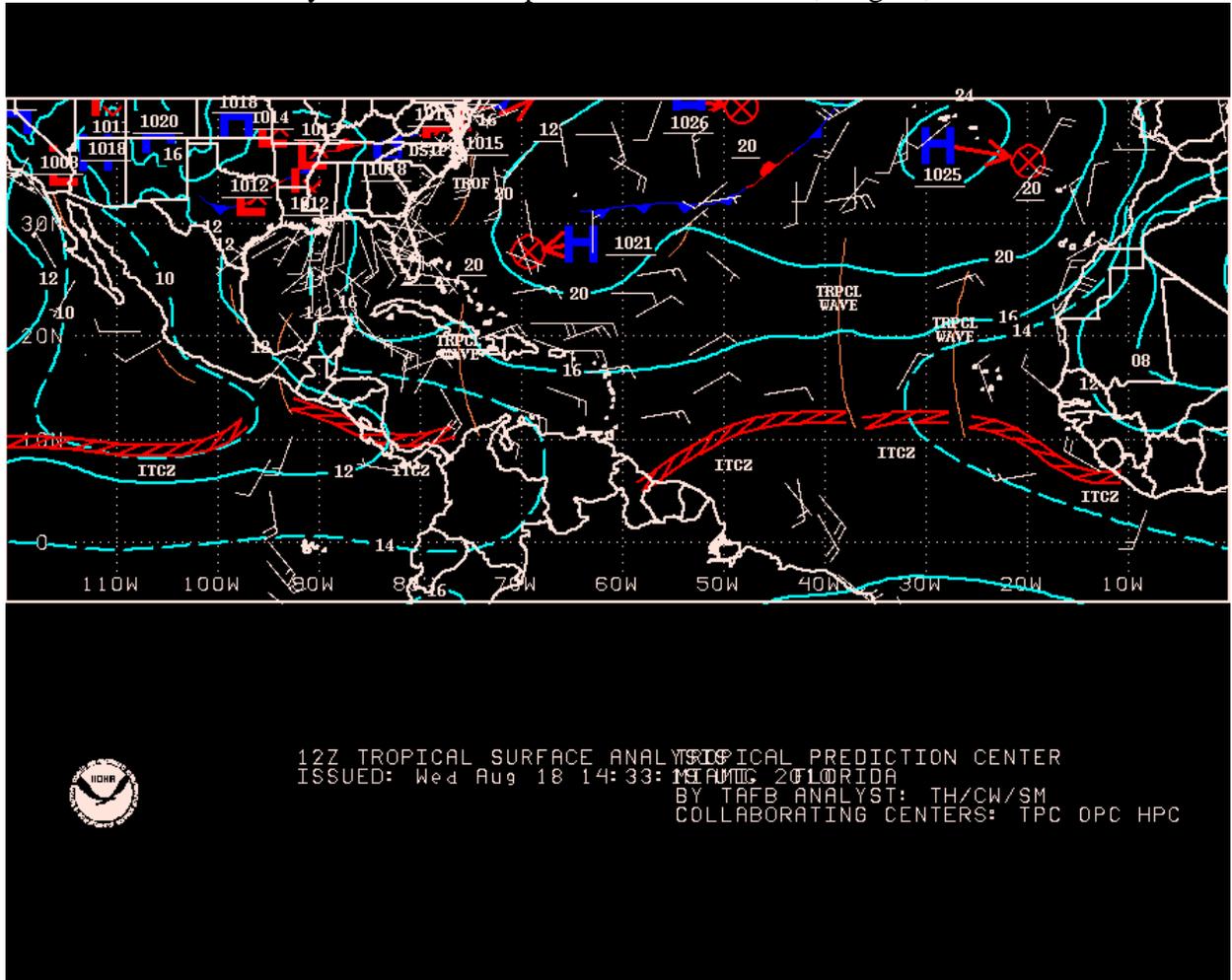
A hovmoller diagram of the 700 hPa vorticity shows a weak, sometimes-difficult-to-track disturbance forming at 8/11 0000 UTC at 30E and moving westwards until the present. The current analyzed pouch position is 19.5N/29.5W (9). An isolated region of 850 hPa vorticity in the CIMSS analysis broke off from the ITCZ and moved northwestwards over the last 48 hr. The northward track of PGI-30L has placed it in an environment of dry air and large-scale subsidence which has suppressed convection over the last 36 hr. The disturbance is currently located to the SE of a 200 hPa anticyclone and is experiencing approximately 10 kts of deep shear. The 0000 UTC ECMWF and UKMET propagate the disturbance westwards over the next 5 days with steady weakening and the system remaining displaced to the NW of the developing PGI-31L. The GFS and NOGAPS quickly drop the disturbance has the convection and increased vorticity in the ITCZ associated with PGI-31L which is forecast to develop overwhelms and deforms the vorticity associated with PGI-30L.

PGI-31L/PGI-33L:

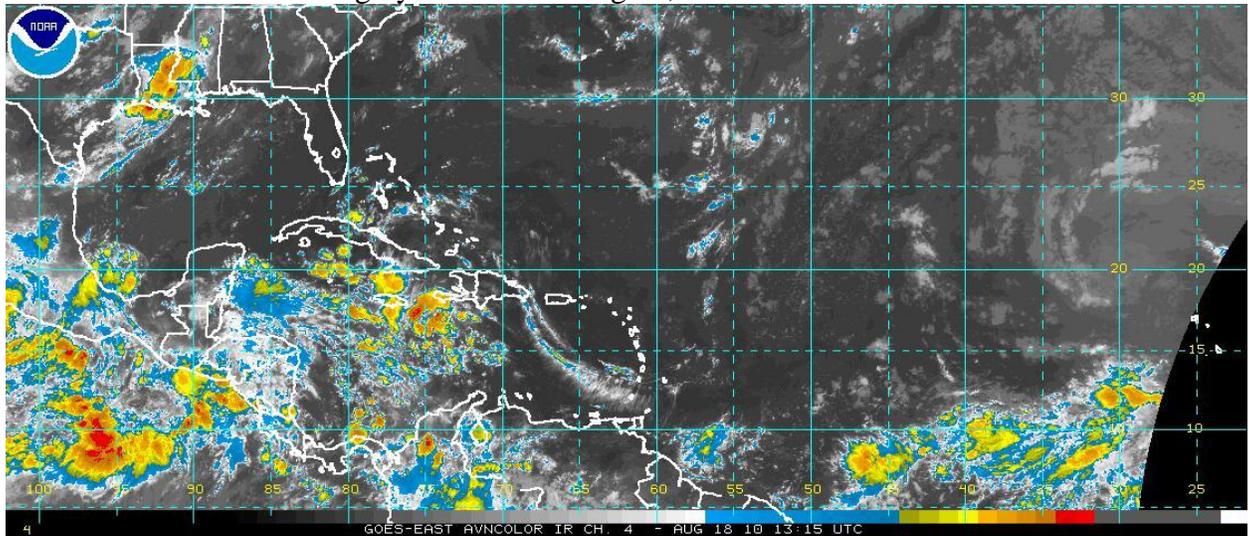
There is currently a strip of enhanced 850 hPa in the CIMMS analysis which extends from 40W-20W at 12.5N (9). A pouch has been identified at 13N/25.5W embedded in this strip of vorticity. The strip of vorticity dips southward to 7.5N and is maximized at the African coast at 9N/14W with an intensity of $5 \times 10^{-5} \text{ s}^{-1}$. Considerable intensification of PGI-33L has taken place over the last 24 hr associated with a large MCS which developed yesterday afternoon and propagated westwards and is currently dissipating at the coast of Africa at 15N/17W (10). There is still considerable model disagreement in the overall evolution of the vorticity and convection in the ITCZ over the next 72 hr. In the 0000 UTC UKMET, PGI-33L developed into a tropical cyclone by approximately 8/21 0000 UTC after leaving the African coast. The 0000 UTC ECMWF did not develop PGI-33L at all but did not appear to initialize the disturbance very well which is likely associated with the fact that the convective system was still ongoing last night. The 0000 and 0600 UTC GFS both slowly develop PGI-33L as it moves into the Atlantic while developing PGI-31L into a tropical cyclone west of PGI-33L. The 0000 UTC NOGAPS predicts a similar evolution to the GFS. The model runs which focus on PGI-31L for development have a tropical cyclone reaching 50W by 8/23 and 60W by 8/25. However, since PGI-31L is still not a well defined disturbance and there is disagreement among the global models as to whether PGI-31L or PGI-33L will be the dominant system beyond 72 hr there is still considerable uncertainty in the evolution of these systems.

Static Images used in discussion:

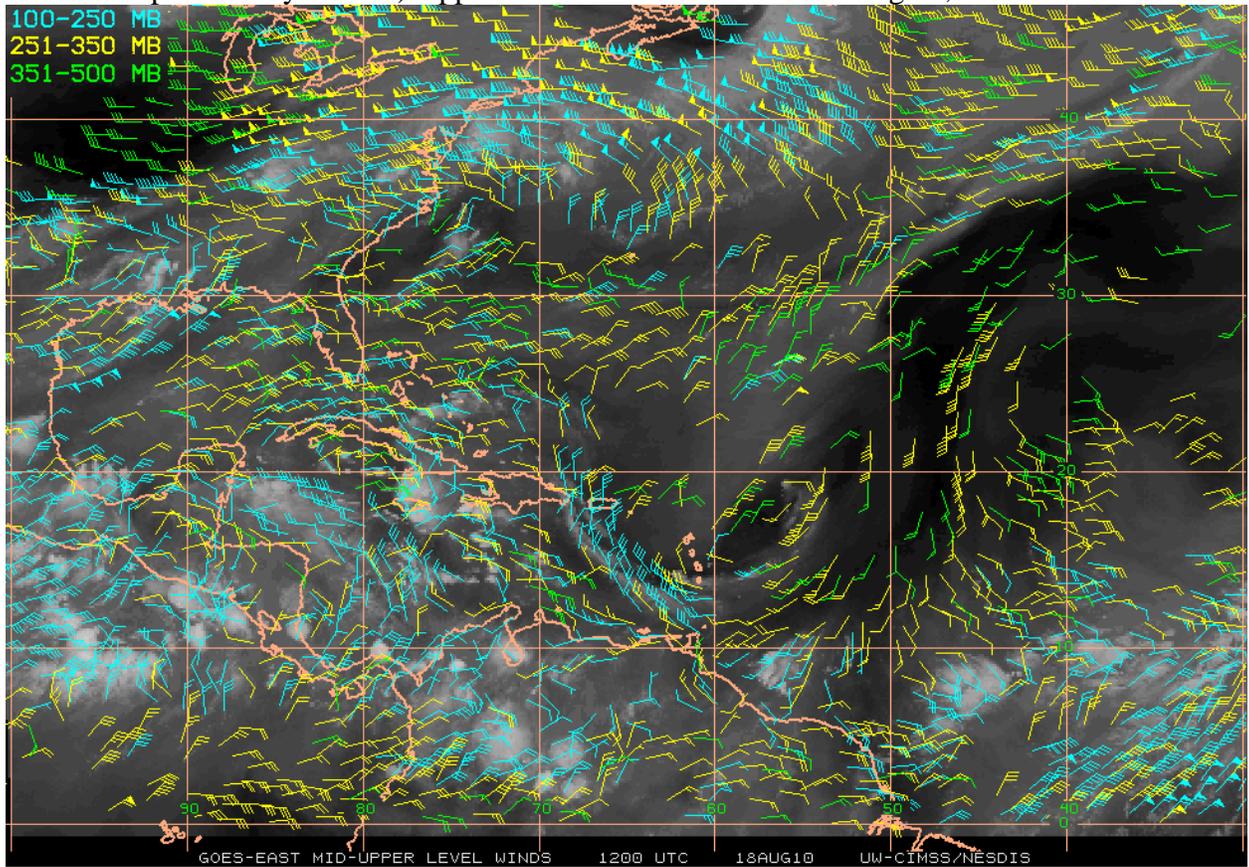
1) 1200 UTC Surface Analysis from the Tropical Prediction Center, Aug 18, 2010:



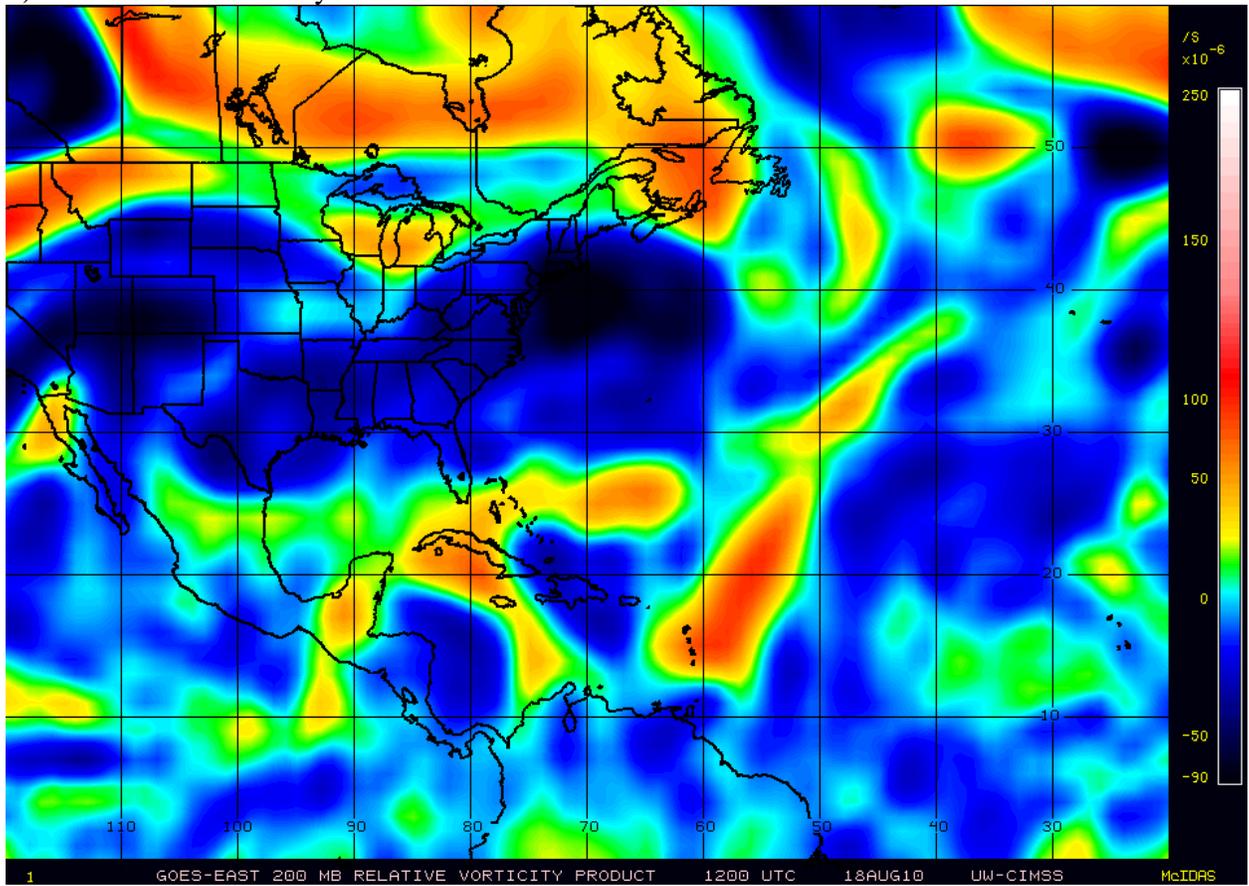
2) Atlantic Wide View IR Imagery 10:45 UTC Aug 18, 2010:



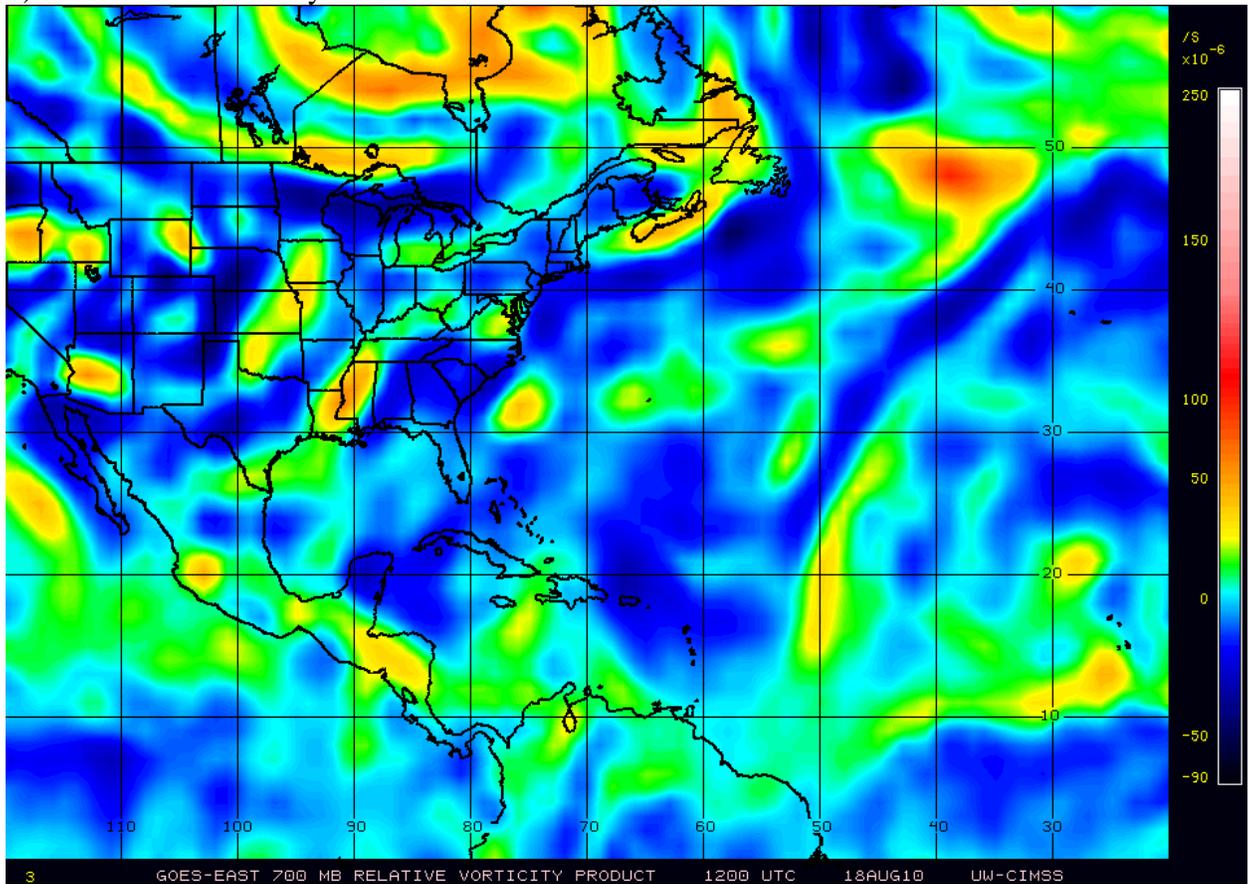
3) CIMSS Tropical Analysis of A) Upper Level Winds at 1200 UTC Aug 18, 2010:



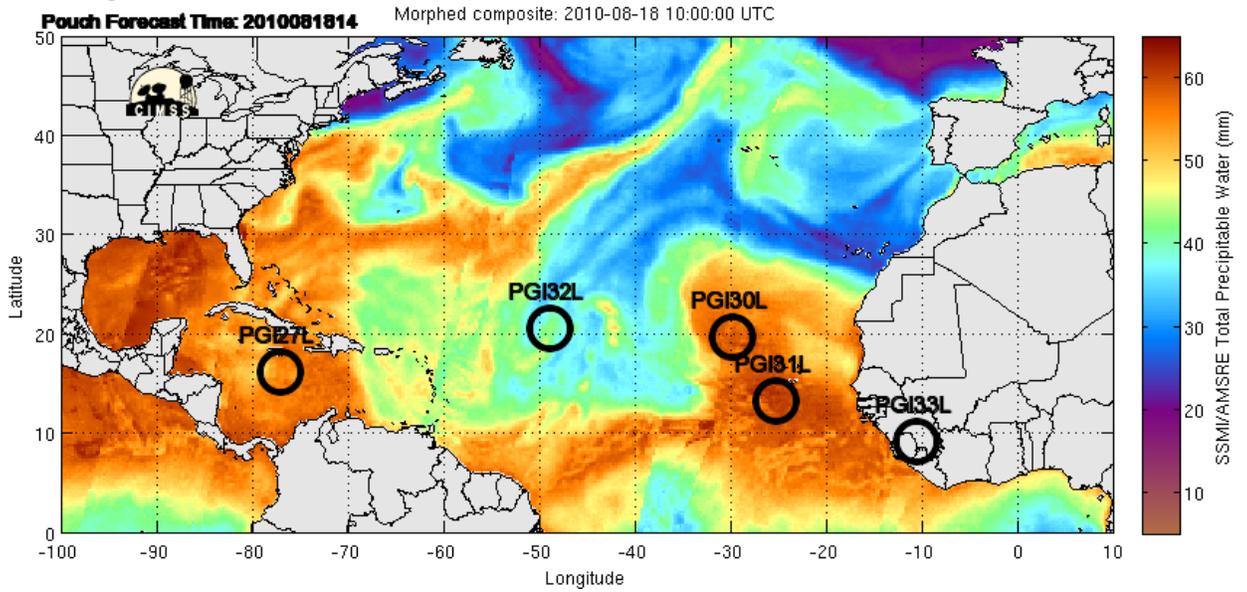
B) And 200 hPa Vorticity:



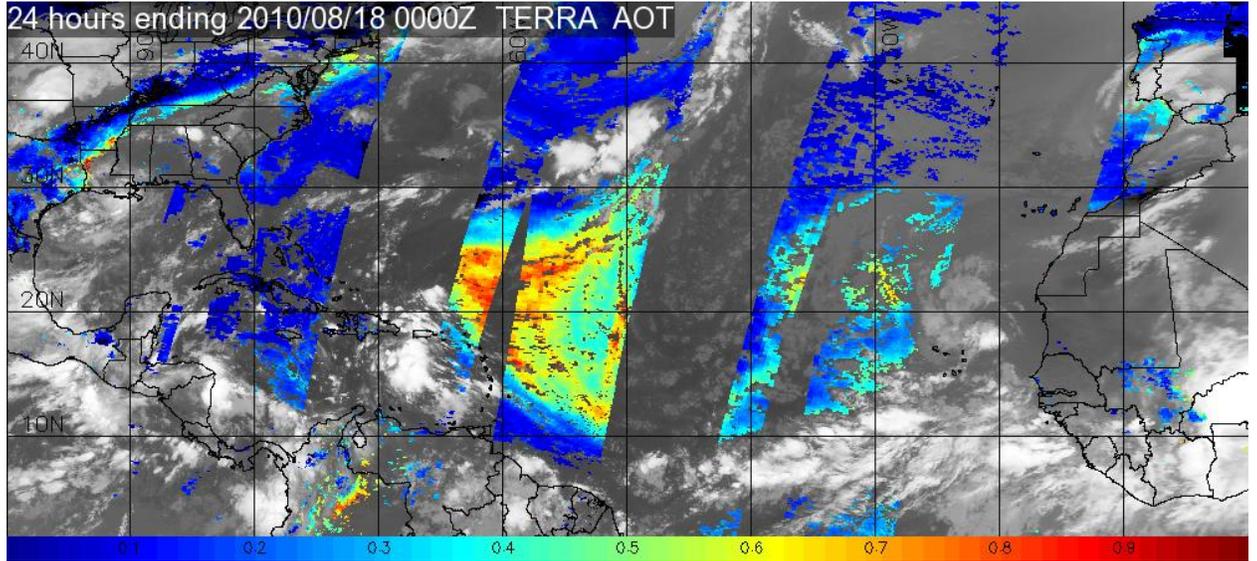
C) And 700 hPa vorticity:



4) TPW Imagery with overlain pouches from Montgomery site for 6 hours ending at 1000 UTC Aug 18, 2010:

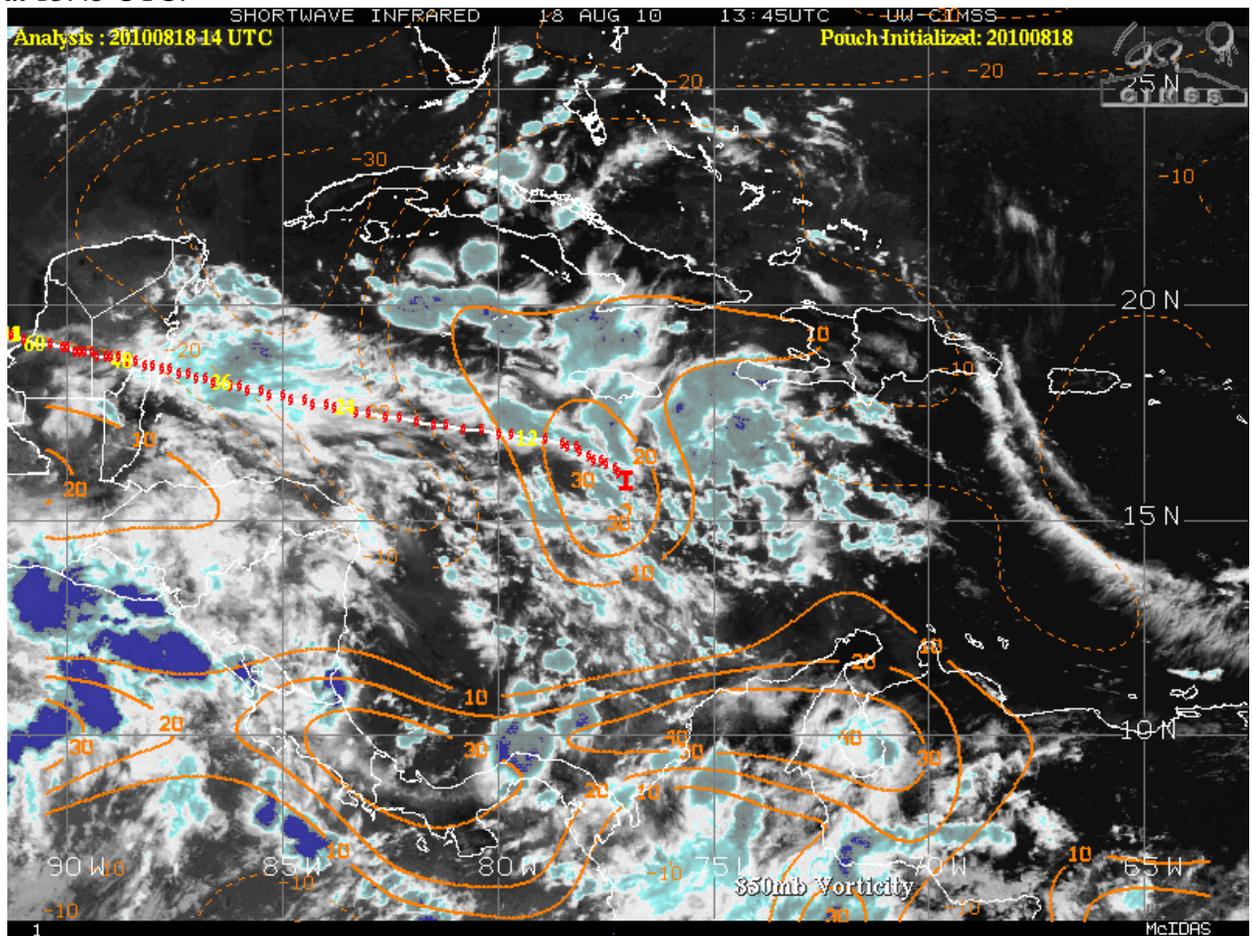


- 5) TERRA Fine Aerosol Optical Thickness 24-hour composite plot from Aug 18, 2010 at 0000 UTC:

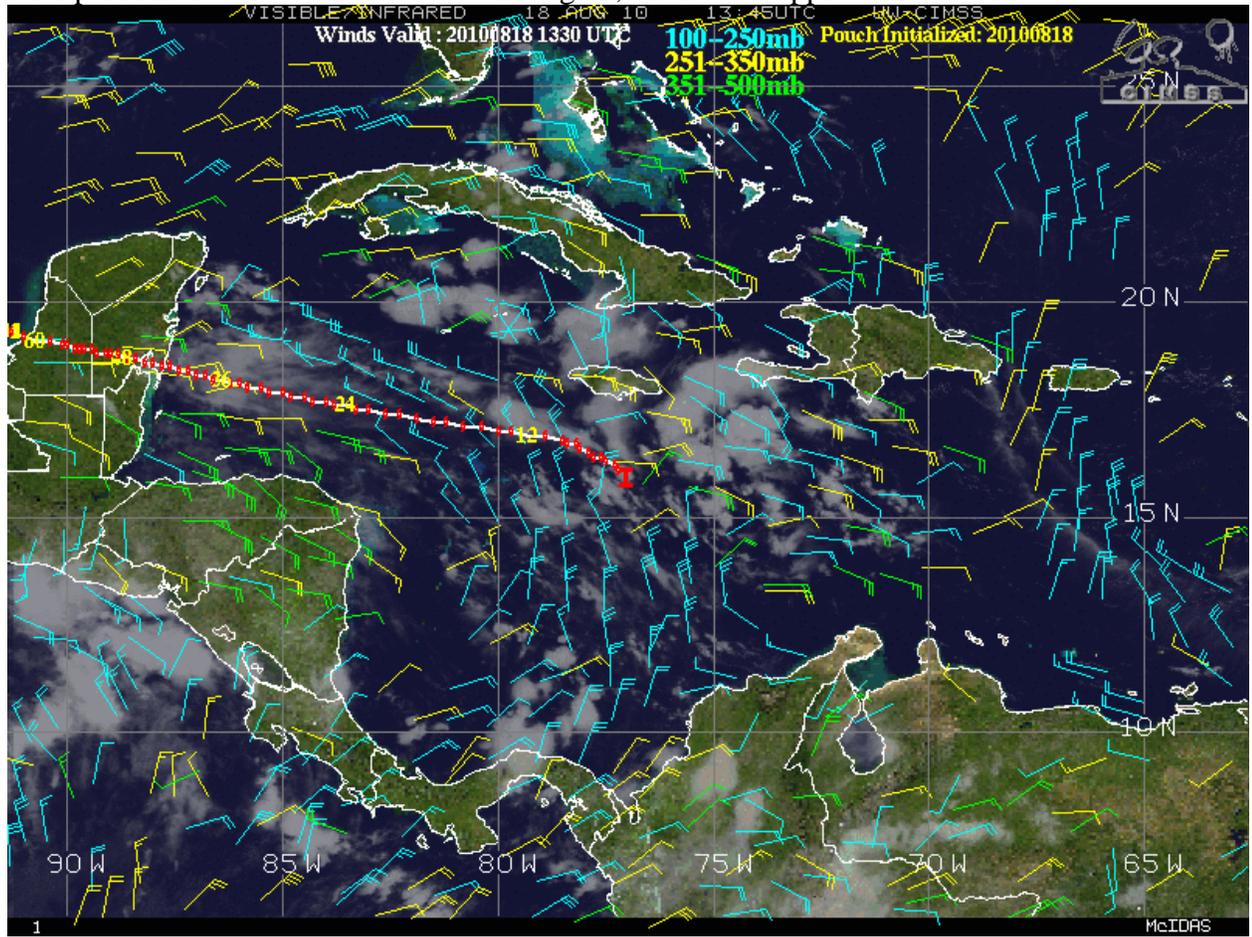


- 6) PGI-27L CIMSS multiproduct

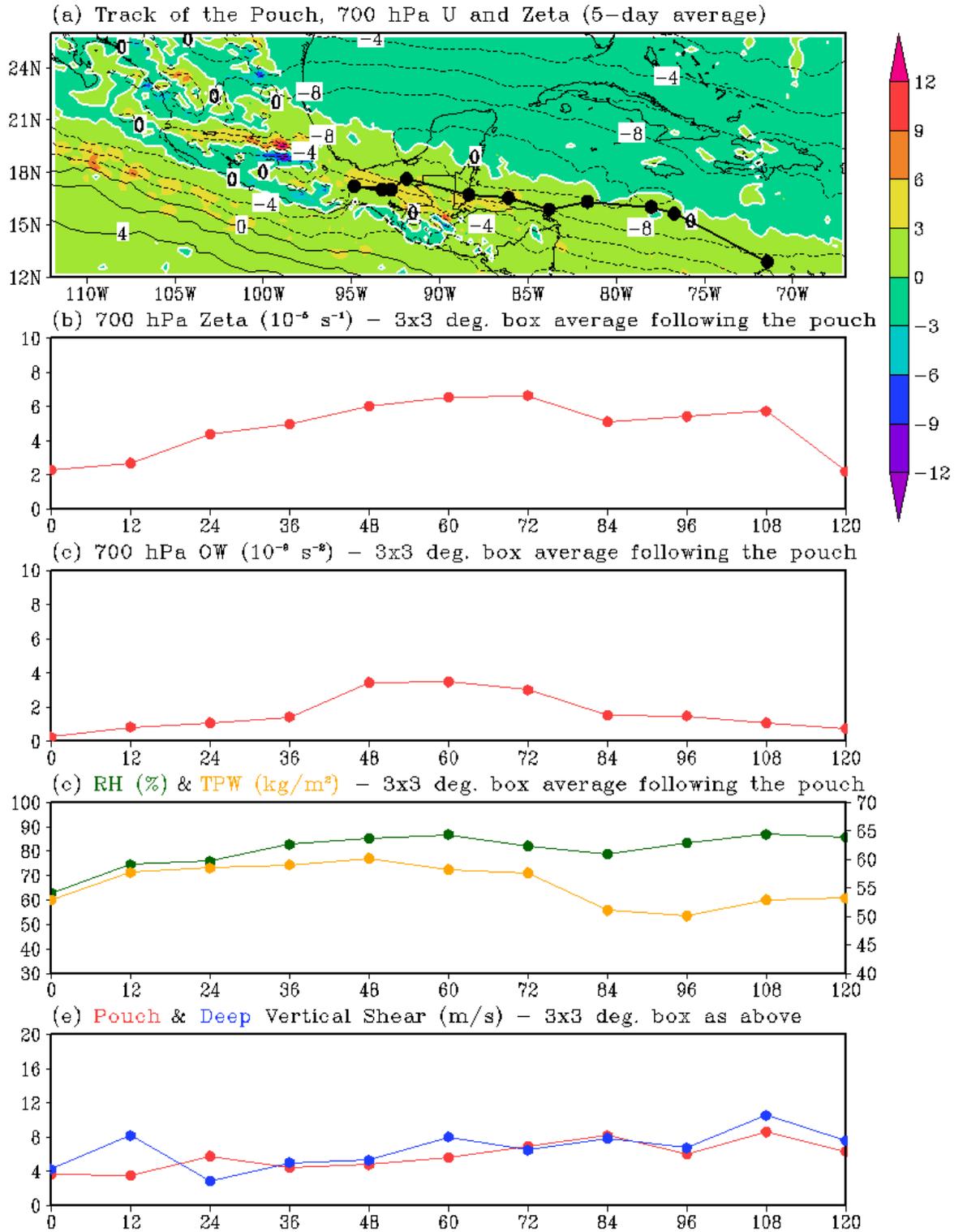
A) from Aug 18, 2010 showing 850 hPa vorticity 0000 UTC pouch position over SW IR at 13:45 UTC:



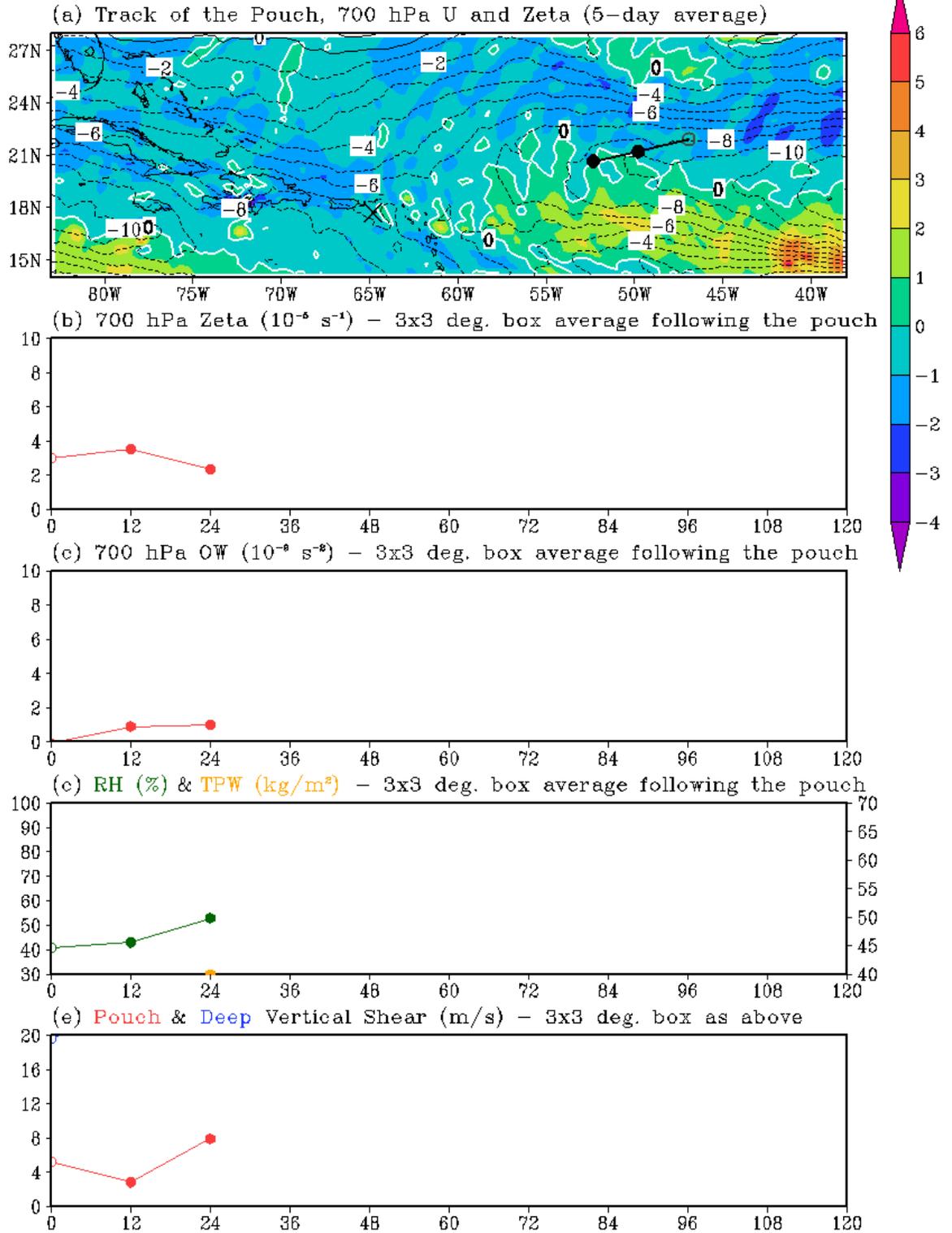
B) Multiproduct for PGI-27L at 13:30 UTC Aug 18, 2010 with Upper Level Winds



7) PGI-27L ECMWF Pouch Forecast from 0000 UTC Aug 18, 2010:
 PGI27L: 5-Day Forecast Based on ecmwf
 Initialized at 2010081800



8) PGI-32L Pouch forecast for the ECMWF model run from 0000 UTC Aug 18, 2010:
 PGI32L: 5-Day Forecast Based on ecmwf
 Initialized at 2010081800



- 9) PGI31L 8/18 1500 UTC CIMSS analysis of 850 hPa vorticity ($\times 10^{-5} \text{ s}^{-1}$, orange contours), surface and bouy stations, and IR.

